

The genus *Dermomurex* (Mollusca:Gastropoda) in Australia

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ABSTRACT

The muricid genus *Dermomurex* has been thought to include only three species in Australia: two of Miocene age and one Recent form. But examination of museum collections has revealed an additional seven species are referable to this genus. The genus as revised now includes:

Dermomurex s.s. Miocene-Recent: *D. garrardi* sp. nov., *D. goldsteini* (Tenison-Woods), *D. angustus* (Verco);

Dermomurex (*Takia*) Oligocene-Recent: *D. (T.) imitator* sp. nov., *D. (T.) cretaceus* sp. nov.; *D. (T.) glebosus* sp. nov., *D. (T.) pachystirus* (Tate);

Dermomurex (*Viator*) Miocene-Recent: *D. (V.) darraghi* sp. nov., *D. (V.) asteriscus* (Tate), *D. (V.) antonius* Vokes.

INTRODUCTION

Knowledge of the presence of the genus *Dermomurex* in Australia, both in the Recent fauna and in the fossil record, has been concealed from the world by a series of misidentifications and general lack of interest in the fossil fauna since the time of Tate (1888). In 1971, when the writer compiled a taxonomic catalogue of the genus *Murex* Linné (i.e., all species that originally had been named as "*Murex*"), she included only three Australian species of this group: "*M.*" *asteriscus* Tate, 1888, and "*M.*" *pachystirus* Tate, 1888, which were assigned to *Dermomurex* (*Takia*), and "*M.*" *crassiliratus* Tate, 1888, assigned to (?)*Dermomurex* s.s.

In a subsequent paper (Vokes, 1974a), a Recent species from the Dampier Archipelago was named as type of a new subgenus: *Dermomurex* (*Viator*) *antonius*; and the species "*M.*" *asteriscus* was transferred to this new subgenus. It was suggested (Vokes, 1974b, p. 8) that the American *D. sexangulus* (Dall, 1915) was a possible ancestor to the line, although this called for a great amount of "remarkability", as the species had to travel half-way around the world. But the alternative of having the Australian and American forms derived by parallelism was equally remarkable.

Then, in 1980, the writer had the pleasure of spending some time working at the Australian Museum and discovered that these species had several unrecognised companions, including three additional members of the subgenus *Takia*, three species of *Dermomurex* s.s., and one new *Viator*.

However, it was ascertained that "*M.*" *crassiliratus* is not a *Dermomurex*, as had been assumed previously on the basis of the original illustration. A photograph of the holotype (in the collections of the South Australian Museum) shows clearly that the shell is a *Pygmaepterys*, allied with the living *P. funafutiensis* (Hedley, 1899). Nevertheless, this leaves us with a total of ten species, where we formerly had but three, an impressive array by any standards.

To begin with the Recent fauna, there are two species that should be assigned to *Dermomurex* s.s. : "*Trophon*" *goldsteini* Tenison-Woods and "*Trophon*" *angustus* Verco. These two, originally named as *Trophon* have customarily been assigned to *Litozamia*, on the basis of Iredale's statement in his "description" of that genus: "The minute shore shells such as *rudolphi*, *goldsteini*, and *brazieri* may be named *Litozamia*" (Iredale, 1929, p. 185). But other than their small size and the presence of an intritacalx there is only a superficial resemblance between *goldsteini* and *angustus* (which is placed near *goldsteini* because of the valid comparison with that species in the original description) and the true *Litozamia* species: *rudolphi* (Brazier, 1894), which is the type; and *brazieri* (Tenison-Woods, 1876), the only other species to be referred to the genus. These two are more fusoid in outline and have only rounded varical ridges rather than true varices. The intritacalx, although relatively thick for a *Trophon*, is much thinner than that of a *Dermomurex*, and is neither tunneled nor deciduous. (This peculiar layer only recently recognised and named by D'Attilio and Radwin, 1971, is figured in an enlarged photograph in Vokes, 1974a, pl. 1, fig. 2.)

The intritacalx is perhaps the single most distinctive feature in the genus *Dermomurex*. Its presence was first noted in the living Australian species by Verco, who stated for "*T.*" *angustus*: "The shell has an inner hard enamel-like layer, and an outer of soft, porous, chalky consistence. This when perfect is nearly smooth, longitudinal and transverse markings being scarcely visible. When slightly denuded coarse and fine longitudinal lines become evident" (Verco, 1895a, p. 87). He further elaborated for "*T.*" *goldsteini*: "The shell in life is composed of two distinct layers, an inner enamel-like foundation and an outer sordid white, loose textured, soft chalk-like coating. In perfect specimens this is smooth, but when very slightly worn, it shows numerous spiral and longitudinal fibres or incisions" (Verco, 1895b, p. 97).

In spite of this excellent description, the species have never been recognised as *Dermomurex*, even by this writer. In partial explanation there may be offered only the fact that when a specimen of "*T.*" *goldsteini* was borrowed several years ago to examine this described intritacalx (which sounded very like a *Dermomurex*), the specimen received was found later to be *rudolphi*! The same shell was figured by Kaicher (1980, no. 2535) as "*Litozamia goldsteini*," on the basis of this erroneous identification, which is only one more example of the problems that have plagued the Australian species of *Dermomurex*. From the beginning it has been a comedy of errors, perpetuated principally by the fact that no adequate figure of either species has ever been published.

In addition to the two Recent members of *Dermomurex* s.s., there is a third fossil species in the collections of both the Australian Museum and the National Museum of Victoria, misidentified in the first case as "*Murex*" *bifrons* Tate, 1888, and in the second as "*Murex*" *didymus* Tate, 1888. Both of the latter are unquestionably valid members of the genus *Pterynotus* and actually bear little more than a family resemblance to this new form, here named *D. garrardi*. All specimens seen come from the famous Balcombian locality at Fossil Beach, near Mornington, Victoria.

In the subgenus *Viator*, as noted above, previously recognised are the Balcombian *D. asteriscus* (Tate) and the Recent *D. antonius* Vokes. In the collections of the National Museum of Victoria there are five examples of another new species that is closely allied with *D. asteriscus*, but is Longfordian-Batesfordian in age. It is here described as *D. darraghi*.

When the possibility of the American *D. sexangulus* being ancestral to the Australian *Viator* line was suggested by the writer (Vokes, 1974b), it was noted that the American species occurred in a peculiar locality, which seemed more allied to the European faunas than to the American. In the collections of the National Museum of Victoria the writer located a specimen from Bird Rock Cliff, near Torquay, Victoria, that was so nearly like *D. sexangulus*, as to appear at first glance the identical species. Closer examination revealed certain differences between the two and the Victoria shell is here named *D. imitator*.

The beds at Torquay have been referred to the Jan Juc Formation, for which the age has been cited variously as anywhere from Eocene to Miocene. Because of the presence of this species so nearly identical with one that occurs in the United States, a sample of the matrix from the aperture of the Australian shell was given to Dr W.H. Akers, micropaleontologist with the Chevron Research Laboratory, who advised that, on the basis of the foraminifer genus *Neorotalia*, the age was latest Oligocene or basal Miocene — which is exactly the same age (Chickasawhayen) as the beds at Silverdale, North Carolina, where *D. sexangulus* occurs. This is the same conclusion presented by Ludbrook (1973, p. 248-251), who has well summarised the nature of the conflicting data.

Thus, it would seem that we must go farther back in geologic time to find a common ancestor for the Australian and American species. Although there are good species of *Takia* in the early Oligocene of North America (*D. cookei* Vokes, 1975) and in the late Oligocene of France (*D. coteavi* Meunier, 1880) neither of these is especially close to the morphotype exhibited by *D. sexangulus* and its Australian mimic, both of which are characterised by an inflated body whorl, a relatively low spire, very strong varices, and an expanded parietal lip much like the living *D. infrons* Vokes, 1974. Presumably, the ancestry of the line lies hidden somewhere in the Tethyan Eocene fauna of which the American and Australian forms represent the two extremes of distribution.

In addition to the aforementioned, in the Victorian collections there are many examples of another new species of early Oligocene age, which had been identified as the species cited in a list by Tate (1895) as *D. cretaceus*, a name the writer is happy to adopt. This new species is extremely common in the Glen Aire Formation at Cape Otway.

Although a member of the subgenus *Takia*, *D. cretaceus* does not seem to be in the general line of the development to the living representative of the group, *D. infrons* Vokes, type of the subgenus, but rather is a more elongate form and seems to be ancestral to yet another new species that occurs in the Pliocene Roe Calcarene of the Madura area in Western Australia, described herein as *D. glebosus*.

In summary, we now see in the Australian fauna, fossil and Recent, a total of ten species of **DERMOMUREX**, to wit:

Dermomurex s.s.

GARRADI Vokes, sp. nov. - Balcombian

goldsteini (Tenison-Woods, 1876) - Kalimnan - Recent

angustus (Verco, 1895) - Recent

Subgenus **Takia**

CRETACEOUS Vokes, sp. nov. — “Late Aldingan”

IMITATOR Vokes, sp. nov. — Jankjukian

pachystirus (Tate, 1888) — Batesfordian-Balcombian

GLEBOSUS Vokes, sp. nov. — Pliocene

Subgenus **Viator**

DARRAGHI Vokes, sp. nov. — Longfordian-Batesfordian

asteriscus (Tate, 1888) — Balcombian

antonius Vokes, 1974 — Recent

The remainder of the Indo-Pacific area has another five species: *Dermomurex* (s.s.) *quilonica* (Dey, 1962), from the middle Miocene of India; and *D. (Triatella) acuticostatus* (Wanner and Hahn, 1935) from the Miocene of Java; and the living forms: *D. (Triatella) neglecta* (Habe and Kosuge, 1971) from the Philippine Islands; *D. (Takia) infrons* Vokes, 1974, from southern Japan, and *D. (Takia) bobyini* (Kosuge, 1984), also from the Philippines.

In 1975 the writer noted that there were relatively few species of *Dermomurex* to be divided up among five subgenera — 32 at that writing. In the present work we have added seven and in another paper (Vokes, *in press*) on the fossil fauna (Mio-Pliocene) of the Dominican Republic (Caribbean) there are an additional four new species. It would seem that the scarcity of species is more a reflection of lack of knowledge than lack of taxa. Although the problem is most acute in the fossil faunas, especially in the Indo-Pacific area, it is still a factor in the living faunas. In 1976 the writer recognised *D. alabastrum* (Adams) as another Caribbean species; in 1978 she named *D. (Tokia) africanus* from East Africa; in 1979 Petuch named *D. (Trialatella) oxum* from off the coast of Brazil; in 1984 Kosuge named *Tokia bobyini* from the Philippines; and even in the extremely well known fauna of the Tropical East Pacific (Mexico to Ecuador) there is another new species *D. gunteri* (Vokes, 1985) just described. In less than ten years we have gone from 32 species to 48.

Dividing lines between the various subgenera of *Dermomurex* are not always well delineated and it has been suggested that perhaps all should be included in the single taxon *Dermomurex* s.s. as was done by Radwin and D'Attilio (1976, pp. 44-77), who only treated 9 species, however. But we should not lose sight of the fact that taxonomy is much like a rainbow. We are attempting to divide a continuous spectrum into discrete groups. There must invariably be intermediate forms.

In the genus *Dermomurex* species usually begin with six (rarely five, seven or eight) varices on the early post-nuclear whorls. In *Dermomurex* s.s. and *Trialatella* Berry, 1964, the number is gradually reduced to only three varices on the later whorls. In *Gracilimurex* Thiele, 1929, the number is reduced to two, mimicking the closely related genus *Aspella* Mörch, 1877. In *Tokia* and *Viator* the original six varices persist into adulthood. But, in addition to the number of varices, there is also an overall difference in shell shape: *Dermomurex* s.s. and *Gracilimurex* have an elongate spire and a very short siphonal canal, so that the proportion of spire height to aperture is equal to or in excess of 50%. The other subgenera have low spires and elongated canals. *Trialatella* and *Tokia* are similar in having moderately long canals but *Trialatella* has only three greatly expanded varices, in contrast to the persistent six of *Tokia*. *Viator* differs from *Tokia* in having a very elongate straight canal. One might suggest a comparison between *Murex* s.s. with its long straight canal and *Chicoreus* Montfort, 1810, which has a short, recurved canal.

As far as this writer is concerned, the elongation of the canal is of as much taxonomic relevance as the number of varices. Thus, the distinction between *Dermomurex* s.s. and *Tokia* is as much the short vs. long canal as it is the three vs. six varices. (It is useful to compare the illustrations on plate 1 and 2.) Therefore, even though the Australian species *D. goldsteini* and *D. angustus* retain six varices, in overall shell shape they seem closer to *Dermomurex* s.s. than to *Tokia*.

A simple key separating the subgenera of *Dermomurex* might be as follows:

I. Spire short

A. Six varices

1. moderate canal — *Tokia*
2. long straight canal — *Viator*

B. Three varices — *Trialatella*

II. Spire elongate

A. Two varices — *Gracilimurex*

B. Three to six varices — *Dermomurex* s.s.

SYSTEMATIC DESCRIPTIONS

Family MURICIDAE da Costa, 1776

Subfamily MURICINAE da Costa, 1776

Genus DERMOMUREX Monterosato, 1890

Poweria MONTEROSATO, 1884, Nomen. Conch. Medit., p. 113. (*Non Poweria* Bonaparte, 1840).
Type-species: *Murex scalarinus* Bivona-Bernardi, by original designation [*Murex scalarinus* Bivona-Bernardi, 1832, =*Murex scalaroides* Blainville, 1829].

Dermomurex MONTEROSATO, 1890, Natural. Sicil., v. 9, p. 181. New name for *Poweria* Monterosato non Bonaparte.

Hexachorda COSSMANN, 1903, Essais Paléoconch. Comp., v. 5, p. 47. Type-species: *Murex tenellus* Mayer, 1869, by original designation.

Subgenus DERMOMUREX s.s.

DERMOMUREX (DERMOMUREX) GARRARDI E.H. Vokes, sp. nov.

Plate 1, figs. 1-4

Description: Shell elongate-fusoid; protoconch of one and one-half smooth, polished whorls; teleoconch of six additional whorls. Spiral ornamentation beginning very faintly on approximately third post-nuclear whorl with slightly raised cords, four or five on the body whorl. Axial ornamentation on first post-nuclear whorl of six small varices that overlap onto the protoconch; continuing for about four or five whorls with six narrow ridge-like varices, then evanescing to only three on the penultimate and last whorls, that at the aperture always the largest. Aperture elongate-oval, with a thin parietal lip contiguous with the outer lip, both completely smooth. Siphonal canal moderately long, almost closed over by a narrow flange of shelly material; terminations of former canals melded in an essentially continuous curved line forming an umbilical chink. In life the exterior of the entire shell covered by a thick intritacalx, probably completely smooth, but in the fossil state always more or less eroded, showing strong spirally oriented tunnels crossed by finer axial growth lines(?), giving a reticulated appearance to the remaining material. The shell surface beneath the intritacalx almost totally smooth, marked only by faint spiral cords and varical ridges.

Holotype: National Museum of Victoria P 74477; height 16.0 mm, diameter 6.5 mm (Plate 1, fig. 1).

Paratype A: Australian Museum C.131237; height 13.4 mm, diameter 5.2 mm (Plate 1, fig. 2).

Paratype B: South Australian Museum P 23845; height 11.6 mm, diameter 5.0 mm (Plate 1, fig. 3).

Paratype C: Australian Museum C.121237a; height 11.0 mm, diameter 5.5 mm (Plate 1, fig. 4).

Other material studied: National Museum of Victoria P 74071 — 74073 [as *Litozamia didymus* (Tate, 1888)] collected by F.A. Cudmore; Australian Museum C.125237 [8 specimens, as *Pterynotus bifrons* (Tate, 1888)], collected by T.R. Garrard and J. Kerslake; locality of all same as type locality.

Type locality: Fyansford Formation (=Balcombe Clay; Balcombian), Fossil Beach, "2 miles" (3.7 km) south of Mornington, Victoria.

Discussion: This middle Miocene species has little relationship to any known living forms, with the possible exception of the Philippine *D. neglecta* (Habe and Kosuge, 1971). That species is lower spired with greatly expanded varical flanges and is assigned to the subgenus *Trialatella*; however, if we had an unworn example of *D. garrardi* it also might have these varical extensions, for the bulk of the varix is formed of intritacalx, not shelly material (compare pl. 1, fig. 7). This is one of the difficulties in attempting to relate fossil and living species of *Dermomurex*. This fragile layer is invariably lost in the fossil state and only remnant patches remain to suggest the former covering layer. Certainly the new species is not closely related to the living *D. goldsteini* and *D. angustus*, both of which retain six varices throughout their life-span. However, they do all share a non-denticulated aperture, which is unique to these Australian forms and *D. neglecta*.

This new species is not especially rare but is known only from the type locality. The majority of the specimens (8 of the 11), including all of the figured type material, was collected by T.R. Garrard and J. Kerslake of the Australian Museum; therefore, it is with pleasure that this new species is named in honour of Mr Tom Garrard, who has contributed so much to the collections at that Institution.

DERMOMUREX (DERMOMUREX) GOLDSTEINI (Tenison-Woods, 1876)

Plate 1, figs. 5, 6

Trophon goldsteini TENISON-WOODS, 1876, Proc. Roy. Soc. Tas. for 1875, p. 136.

Trophon goldsteini Tenison-Woods. VERCO, 1895, Trans. Roy. Soc. So. Aust., v. 19, p. 97, pl. 1, figs. 4, 4a, 5 (said to be fig. 4b).

Trophon goldsteini Tenison-Woods. MAY, 1923, Illus. Index Tasmanian Shells, pl. 40, fig. 1.

Litozamia goldsteini (Tenison-Woods). IREDALE, 1929, Rec. Aust. Mus., v. 17, p. 185.

Litozamia goldsteini (Tenison-Woods). COTTON, 1956, Publ. Roy. Soc. So. Aust., Malac. Section., no. 8, Muricidae, pl. 1, fig. 19.

Trophon (Litozamia) goldsteini Tenison-Woods. LUDBROOK, 1958, Trans. Roy. Soc. So. Aust., v. 81, p. 59, figs. 12, 13.

NOT *Litozamia goldsteini* (Tenison-Woods). KAICHER, 1980, Card Catalogue of world-wide shells, Pack no. 25 -Muricidae, Pt. 5, no. 2535 (= *Litozamia rudolphi*).

Description: Shell fusoid in outline, with seven teleoconch whorls and a protoconch of one and one-half smooth bulbous whorls. Spiral ornamentation of very faint striae, covering entire surface; on body whorl four to six vague spiral cords, best seen in specimens still covered by intritacalx. Axial ornamentation beginning on first post-nuclear whorl with six rounded varices that each cross the suture, overlapping the previous whorl; varical formation progressively abapertural, giving a backward curve to the varical line extending from spire to canal. Aperture oval, inner lip smooth, appressed; outer lip smooth, slightly patulous; no trace of an anal canal; siphonal canal short, broad, partially covered by a shelly plate but open by a narrow slit, recurved at distal end. When fresh exterior surface completely covered by a thick, pale brown intritacalx, having a linen-like texture; when eroded the remnant intritacalx remaining between spiral threads giving a frosted white appearance. Colour beneath the intritacalx white except for two faint brown bands, one at the suture and one at base of the body whorl. Radula typically muricine, with a rachidian plate having three major cusps, alternating with two minor cusps.

Type material: Tasmanian Museum TM 5241 (two syntypes, E823-8164) (T.A. Darragh, *in litt.* 24 Oct. 1983).

Type locality: Long Bay, Southern Tasmania.

Figured specimens: Australian Museum C.125234; height 18.5 mm, diameter 9.4 mm; locality: d'Entrecasteaux Channel, Tasmania (M. Ward Coll.) (Plate 1, fig. 5). Australian Museum C.125232; height 21.0 mm, diameter 10.0 mm; locality: Eden, NSW (N. Buckland Coll.) (Plate 1, fig. 6).

Discussion: Although one of the characteristics distinguishing the subgenus *Takia* from *Dermomurex* s.s. is the retention of six varices throughout the development of the shell, there is also an elongation of the siphonal canal and a reduction of spire height that gives the shell a very different appearance. The two living Australian species *D. goldsteini* and *D. angustus* do have six varices but the overall shape and appearance of the shell is much more akin to *D. scalaroides*, type of the genus (see pl. 1, fig. 10). For this reason, even though they have six varices they will be retained in *Dermomurex* s.s.

Winston Ponder, of the Australian Museum, has prepared a radula of *D. goldsteini* and it is typical of the *Dermomurex* group, which in turn is typically muricid. Radwin and D'Attilio (1976, text fig. 23) have illustrated the radula of *D. obeliscus* (A. Adams, 1853), showing the similarity to

other members of the subfamily Muricinae, in contrast to the subfamily Trophoninae, as illustrated in their text-figures 121 (*Boreotrophon clathratus*) and 132 (*Trophon geversianus*).

As noted above, all of the illustrations of this species leave much to be desired. That of Cotton (1956) shows denticulations on the inner side of the apertural lip, which, so far as the writer is aware, do not occur in this species. Likewise, Ludbrook's illustration (1958) shows what seems to be a two and one-half whorl protoconch when, in fact, the species has a one and one-half whorl protoconch, as do most other species of *Dermomurex*. However, as she notes, all of her specimens were more or less eroded and this may be the explanation for the appearance of the figured example.

Ludbrook (1958, p. 59) reported this species from the Pliocene Dry Creek Sands of South Australia. In addition, in material from the collections of the Western Australian Museum sent to the writer for study, there is a single specimen (no. 79.1530) from the Grange Burn Coquina (Kalimnan) at Hamilton, Victoria. Thus, *D. goldsteini* was widely distributed in southern Australia during Pliocene time.

The only available information suggests this is a relatively common species, found in depths of about 10-20 fathoms (18-36 m) along the southeastern corner of Australia (Tasmania, South Australia, to southernmost New South Wales).

DERMOMUREX (DERMOMUREX) ANGUSTUS (Verco, 1895)

Plate 1, figs. 8, 9

Trophon angustus VERCO, 1895, Trans. Roy. Soc. So. Aust., v. 19, p. 86, pl. 1, figs. 6, 6a (said to be 5, 5a).

Litozamia angusta (Verco). COTTON, 1956, Publ. Roy. Soc. So. Aust., Malac. Sect., no. 8, Muricidae, pl. 1, fig. 18.

Description: Shell narrowly fusoid in outline, with six teleoconch whorls and a protoconch of one and one-half smooth, bulbous whorls. Spiral ornamentation of fine striae covering entire surface, on body whorl five broad, obsolete spiral cords, most marked adjacent to varices. Axial ornamentation on each whorl of six low, rounded varices, each formed slightly abaperturally relative to the corresponding varix on previous whorl, giving a faintly sinuous curve to the varical line extending from spire to canal. Aperture elongate-oval, inner lip smooth, appressed; outer lip smooth, slightly patulous; siphonal canal short, broad, almost straight, partially covered over by a shelly plate but open by a narrow slit. Exterior of shell covered by a thick, chalky intritacalx, almost smooth when fresh but when slightly worn, coarse and fine axial lines and numerous spiral incisions becoming visible. Colour dirty white; animal unknown.

Type material: South Australian Museum D13482 (two paratypes); holotype not found.

Type locality: St Vincent Gulf, South Australia.

Figured specimens: Paratype A, South Australian Museum D13482(A); height 10.3 mm, diameter 4.5 mm (Plate 1, fig. 8). Paratype B, South Australian Museum D13482(B), height 10.6 mm, diameter 4.5 mm (Plate 1, fig. 9). Locality of both, St Vincent Gulf, "dredged in deep water."

Discussion: *Dermomurex angustus* is seemingly a rare shell, presumably because of its deeper habitat. No material other than the two figured paratypes are known to the writer. According to Verco the original type lot consisted of three specimens, two live, one dead. Presumably paratype A is the dead shell, paratype B is one of the live specimens and the holotype, which Verco stated was in his collection, was the second live one. The present location of the latter is not known to the writer.

As Verco noted, this species is differentiated from the closely related *D. goldsteini* by being smaller and more slender in overall shape. The ratio of width to height is about 0.5:1 in *D. goldsteini*, and 0.4:1 in *D. angustus*. Otherwise, there is little difference and, like *D. goldsteini*, it is also here assigned to *Dermomurex* s.s. in spite of the presence of six varices in the adult stage.

Subgenus TAKIA Kuroda, 1953

Takia KURODA, 1953, *Venus*, v. 17, no. 4, p. 190.

Type-species: *Murex inermis* Sowerby, 1841, by original designation (*non Murex inermis* Philippi, 1836, nec *M. inermis* Dujardin, 1837 [?=Philippi]) = *Dermomurex (Takia) infrons* Vokes, 1974.

DERMOMUREX (TAKIA) CRETACEUS E.H. Vokes, sp. nov.

Plate 2, figs. 4-6

Description: Shell fusoid in outline; protoconch of one and one-half smooth, cylindrical whorls, six teleoconch whorls. Spiral ornamentation extremely weak, not visible until third post-nuclear whorl, with one cord just posterior to suture; gradually adding a second at shoulder; on body whorl three cords, strength of these varying greatly between individuals, some almost smooth; only on body whorl very faint threads between major cords. Axial ornamentation beginning with six to eight small flanges that overlap onto protoconch on first post-nuclear whorl, becoming rib-like varices with the same number on each succeeding whorl. At intersection of axial varices and spiral cords small reflected protrusions developed, that at shoulder the largest. Strength of varices variable, some individuals with simple swollen ridges, others with distinct rib-like varices; no pattern apparent but usually all alike on any one specimen. Aperture elongate-oval, parietal lip narrow, smooth, appressed along entire length, bending into outer lip; latter usually also smooth but rarely having five small denticles; lip curved into reflected protrusion at shoulder and posterior portion slightly patulous. Siphonal canal long, recurved into a continuous curved line, forming a faint umbilical chink. In life, presumably covered with a thick intritacalx, this usually more or less lost in the fossil state, leaving behind a pattern of spiral tunnels visible over the entire shell exterior.

Holotype: National Museum of Victoria P 74140; height 24.6 mm, diameter 11.7 mm (Plate 2, fig. 4).

Paratype A: South Australian Museum P 23844; height 18.3 mm, diameter 9.5 mm (Plate 2, fig. 5).

Paratype B: Australian Museum C.139791; height 11.5 mm, diameter 6.4 mm (Plate 2, fig. 6).

Other material studied: National Museum of Victoria, specimens numbered P 74093-144, from Glen Aire Clay ("Late Aldingan", i.e. early Oligocene), Pt Flinders, near Cape Otway; collected by T.A. Darragh and T. Hughes (P 74093-104) or F.A. Cudmore (P 74105-144).

Type locality: Glen Aire Clay (early Oligocene), Pt Flinders, near Cape Otway, Victoria.

Discussion: As noted in the Introduction, this new species is extremely common in the early Oligocene Glen Aire Clay*. Although it is clearly of the *Takia* group, it differs from the type of the subgenus, *D. infrons*, in being more angulate, with a strong fold at the shoulder of the shell. It most nearly resembles the recently described *Takia bobyini* Kosuge (1984, p. 144, pl. 50 figs. 1, 2 — fig. 1 reproduced here, pl. 2, fig. 7) from deep water in the Philippines. The Australian species differs from the Philippine one in having only three major spiral cords in place of the four in the Recent form and in having a less inflated body whorl.

The name "*Trophon cretaceus*" was first cited by Tate (*in* Tate and Dennant, 1895, p. 111) in a list of fossils from Cape Otway. It is assumed that Dr Darragh recognised the derivation of the name, in reference to the intritacalx, and applied it to the species in the Museum collections. Certainly there could be no more appropriate epithet, and it is with pleasure that the writer adopts the manuscript name of Tate.

*In the museum collections there are also another four juvenile specimens (P 74078, P 74090-92), collected by F.A. Cudmore from the Janjukian beds at Bird Rock Cliff, Torquay. Although they may be referable to *D. cretaceus*, they are too immature to be positive. Inasmuch as they do not occur in the same formation as the typical form, the writer prefers to await the discovery of adult material before stating that the species also occurs in the Jan Juc Formation.

DERMOMUREX (TAKIA) IMITATOR E.H. Vokes, sp. nov.

Plate 2, fig. 1

Description: Shell with protoconch of one and one-quarter smooth bulbous whorls, larger than succeeding post-nuclear whorl; teleoconch with five whorls in unique holotype, probably six in adult stage. Spiral ornamentation not developed until approximately second post-nuclear whorl with initially a single strong cord immediately posterior to suture, developing a second cord at the shoulder on third post-nuclear whorl; the two cords continuing through penultimate whorl, four strong cords on body whorl, the anteriormost not quite as strong as the others; one additional weaker cord on subsutural area and another at base of the body whorl; between these stronger cords extremely faint spiral threads, best seen on the body whorl. Axial ornamentation beginning with a small sharp varix marking the change from proto- to teleoconch; eight ridges on each post-nuclear whorl, becoming increasingly heavy and cord-like with growth; on fourth postnuclear whorl every third ridge becoming a true varix, with intervening ridges remaining as intervarical ribs, of the same size as the varices; by fifth whorl every ridge becoming a true varix, eight in all on body whorl. At intersection of axial ridges and spiral cords pointed nodes developed, their size proportional to the strength of the cord. Whorls greatly inflated; suture deeply impressed, crossed by the varical ridges abutting against the previous whorl. Aperture large, ovate; smooth, heavy parietal lip, free-standing anteriorly, appressed posteriorly and curving smoothly into the outer lip, the latter having five weak denticulations on the slightly patulous anterior half. Siphonal canal moderately long, open by a narrow slit, recurved at the distal end; terminations of previous canals fitting within each other, giving rise to a marked umbilical chink. Shell surface almost completely smooth except for spiral cords and extremely weak threads; in life the exterior presumably covered with a heavy deciduous inritacalx, only traces remaining in holotype.

Holotype: National Museum of Victoria P 74074; height 28.4 mm, diameter 19.6 mm (Plate 2, fig. 1).

Type locality: Jan Juc Formation (Janjukian); "The Ledge," Bird Rock Cliff, Torquay, Victoria (F.A. Cudmore Coll.).

Discussion: This remarkable new species from the Jan Juc Formation is superficially identical to the American *D. sexangulus* (Dall, 1915) from the latest Oligocene-earliest Miocene Silverdale Beds of North Carolina. However, the American species has a relatively small protoconch, approximately one-half the diameter of the very large protoconch of the Australian species (see pl. 2, fig. 1c) and from the first post-nuclear whorl has six true varices on every whorl. The Australian shell initially has eight ridges per whorl, which become true varices only on the fourth and fifth post-nuclear whorls. The denticulations on the inner lip of the American shell are somewhat stronger and more numerous, extending over the entire inner lip in some specimens. However, in some examples they are no different from the unique Australian shell and so more material may remove this apparent distinction. Regardless, the overall appearance of the two species is incredibly similar and they must be the result of parallel development from a not too distant common ancestor, presumably in the Tethyan area.

When the writer separated the new subgenus *Viator* from the ancestral line of *Takia* (Vokes, 1974a, p. 2) she assigned the American species *D. sexangulus* to *Viator* as well, on the assumption that it was directly ancestral to the *Viator* line. However, the discovery of this new, more reasonable, ancestor in the Australian Tertiary caused a re-evaluation of the position of *D. sexangulus*. Both *D. sexangulus* and *D. imitator* have the relatively short recurved, siphonal canal and the large inductura of typical *Takia*, in contrast to the long straight canal and small inductura of *Viator*. Therefore, it is deemed preferable to return *D. sexangulus* to *Takia*, relegating the development of *Viator* entirely to the Australasian region. The other American species, *D. vaughani* (Maury, 1910) and *D. curviductus* Vokes, 1975, as well as the Italian *D. taurinensis* (Michelotti, 1841) (all figured in Vokes, 1975), should also be returned to *Takia*, as they have more affinities with the ancestral line than with the derivative one (even though one must admit *D. vaughani* with its straight canal is another interesting example of convergence).

DERMOMUREX (TAKIA) PACHYSTIRUS (Tate, 1888)

Plate 2, fig. 3

Murex (Rhinocantha) pachystirus TATE, 1888, Trans. Roy. Soc. So. Aust., v. 10, p. 102, pl. 2, fig. 11.*Bolinus pachystirus* (Tate). COTTON, 1956, Publ. Roy. Soc. So. Aust., Malac. Section, no. 8, Muricidae [p. 1]*[Aspella] (Takia) pachystirus* (Tate). VOKES, 1971, Bulls. Amer. Paleont., v. 61, no. 268, p. 78.*Dermomurex (Takia) pachystirus* (Tate). VOKES, 1974, J. Malac. Soc. Aust., v. 3, no. 1, p. 7; 1975, Tulane Stud. Geol. Paleont., v. 11, no. 3, p. 127.

Description: Shell inflated biconical, with five teleoconch whorls and a protoconch of one and one-half smooth, bulbous whorls. Spiral ornamentation beginning with a single weak cord at the periphery, others gradually intercalated; body whorl with six weak spiral cords, visible primarily where they cross the varices, that cord at the periphery causing a marked angulation of the whorl; surface otherwise marked only by faint spiral striae. Axial ornamentation from first teleoconch whorl consisting of six low, ridge-like varices, marked only by the spiral cords and placed alternately with the corresponding varices of the preceding whorl eliminating any continuity of varical line from spire to canal. Suture deeply impressed, strongly sinuated by alternation of varices. Aperture large, angulate, inner lip smooth, narrow, appressed along the entire length; outer lip weakly lirate within. Siphonal canal long, almost straight but slightly recurved at distal end; open by a narrow slit. In life entire exterior surface covered by a thick intritacalx, usually lost in fossil state, with only remnant patches remaining.

Holotype: South Australian Museum (AUGD) T 410.**Type locality:** Murray River, south of Morgan, South Australia.

Figured specimen: Holotype, South Australian Museum (AUGD) T 410; height 24 mm, diameter 15.5 mm (*vide* Tate, 1888); locality, Cadell Marl (Balcombian), Murray River Cliffs, 5.8 km south of Morgan (Tate, 1888, p. 172; Ludbrook, 1973, p. 251) (Pl. 2, fig. 3).

Discussion: According to Tate (1888, p. 103) this species occurs in the lower beds at Muddy Creek (Muddy Creek Marl, Balcombian) and in the "Gastropod-bed, River Murray Cliffs, near Morgan" (Cadell Marl Member of the Morgan Limestone, see Ludbrook, 1973, p.251). It must be a rare species as there is but one other specimen in the collections of the National Museum of Victoria and no others known to the writer.

The shape of the outline in this species is unlike any other member of the subgenus *Takia* presently known. The body whorl is extremely inflated, with a marked angulation at the periphery of the shell rather than at the shoulder, as in the previous species. The suture is deeply impressed, with the varical ridges causing it to be strongly sinuated. As with *D. imitator* and *D. sexangulus*, the aperture is denticulate.

Tate placed this species in the subgenus *Rhinocantha*, a synonym of *Bolinus* Pusch, 1837 (type: *Murex brandaris* Linné, 1758), but the resemblance is only superficial. The writer (Vokes, 1963, p. 151) made the same mistake when she referred the American *D. vaughani* (Maury) to "*Murex (Bolinus)*" because of the same sort of confusion. The two groups are only distantly related and the resemblances are due purely to convergence; the Miocene ancestral species of *Bolinus* do not have any similarity to the Miocene members of *Takia*. But when all of the intritacalx is removed from a *Takia*, as it so often is in the fossil state, then the similarity to the Recent Mediterranean *Murex brandaris* is remarkable.

DERMOMUREX (TAKIA) GLEBOSUS E.H. Vokes, sp. nov.

Plate 3, figs. 5-7

Description: Shell biconic in outline; six teleoconch whorls and a protoconch of one and one-quarter smooth, bulbous whorls, tip immersed. Spiral ornamentation beginning on first post-nuclear whorl, consisting of only extremely faint threads superimposed upon indistinct larger cords; on early whorls one cord at shoulder, a second at periphery, and a weaker third on subsutural ramp; on body whorl five or six such cords, plus an additional five or six on the extended siphonal canal.

Axial ornamentation beginning on first post-nuclear whorl, consisting of rounded varices, unornamented except for a moderately strong angulation at the shoulder; five or six per whorl, but always the same number on each whorl of any given specimen (i.e., all five or all six). Suture appressed but crossed by varices abutting corresponding varix on previous whorl, placed abaperturally giving a backward spiral to varical line from apex to canal. Aperture oval; inner lip smooth, appressed; outer lip slightly patulous at anterior half, with about five indistinct nodes on inner edge. Siphonal canal moderately long, open by a narrow slit, recurved at distal end, forming a small umbilical chink. In life covered by an extremely thick intritacalx but invariably lost in fossil state, only small remnant patches remaining.

Holotype: Western Australian Museum 84.601; height 28.8 mm, diameter 15.2 mm (Plate 3, Figure 5).

Paratype A: Western Australian Museum 84.602; height 6.3 mm, diameter 2.8 mm (Plate 3, figure 6).

Paratype B: Australian Museum C. 90093; height 28.8 mm; diameter 14.8 mm (Plate 3, figure 7).

Other material studied: Western Australian Museum 80.230 (12 specimens), 80.214 (8 specimens), both from basal 0.4 m of pit; nos. 81.1726, 80.243 (1 each), both from spoil on floor of pit; 81.1035 (4 specimens), from basal 0.6 m of pit; collected by V.A. Ryland, G.E. and W.E. Kendrick; locality of all same as type locality.

Type Locality: Roe Calcarenite (Pliocene), Roe Plains, pit 0.5 km north of Hampton Repeater Tower; Madura District, Western Australia.

Discussion: In the Roe Calcarenite of Western Australia there are numerous specimens of a large species that in general appearance is most nearly akin to *D. cretaceus*, described above, and the recently described *D.(T.) bobyini* (Kosuge) from the Philippine Islands. But it differs from both of these in having a more massive, more heavily ornamented shell; hence the specific name (*glebosus*, Latin — lumpy). These three species share the angulate shoulder not seen in any other species of *Takia*.

In her original study of the mollusks of the Roe Calcarenite, Ludbrook (1978) concluded that, because of the large number of extant species, the age was early Pleistocene. However, George W. Kendrick of the Western Australian Museum, who is working on the fauna of the Roe, considers the age to be Pliocene (*in litt.*, 31 August 1982). Although Mr Kendrick is studying the fauna of the Roe, he graciously allowed the writer to include this species in her study.

Subgenus VIATOR Vokes, 1974

Viator VOKES, 1974, J. Malac. Soc. Aust., v. 3, no. 1, p. 4.

Type species: *Dermomurex (Viator) antonius* Vokes, 1974, by original designation.

DERMOMUREX (VIATOR) DARRAGHI E. H. Vokes, sp. nov.

Plate 3, figs. 3, 4.

Description: Shell moderately large, protoconch of one and one-half smooth, bulbous whorls, six teleoconch whorls in adult. Spiral ornamentation primarily developed in the deciduous intritacalx, beneath this just a single cord at periphery on early whorls, very faint secondary threads gradually added; on body whorl four or five stronger cords, that at the shoulder weakest; between cords only faint spiral threads crossed by equally faint axial growth striae, giving a cloth-like pattern to the shell surface. Axial ornamentation beginning with six or seven small rounded ribs on each whorl, gradually strengthening into varices but number remaining constant. Varices drawn out at shoulder into an upturned angulate process, with a small open flange present only at the shoulder; remainder of varix rounded and crossed by spiral cords. Suture deeply impressed, sinuated by varices abutting against varices of previous whorl. Aperture pyriform; inner lip narrow, smooth, appressed; curving into outer lip, also smooth within. Siphonal canal long, almost straight, only weakly recurved at distal end, with previous canals diverging as small spurs on some specimens, others neatly fused into a tube-like form, but open by a narrow slit on the abaxial side. In life covered by a thick intritacalx, in fossil examples only remnants, showing a series of tiny tunnels paralleling the spiral cords.

Holotype: National Museum of Victoria P 74086; height 18.5 mm, diameter 10.7 mm (Plate 3, fig. 3).

Paratype: National Museum of Victoria P 74083; height 19.0 mm, diameter 10.4 mm (Plate 3, fig. 4).

Other material studied: National Museum of Victoria P 74081, 74082, from Fishing Point Marl, lower horizon (Longfordian), cliff 10 m above Lake Craven, Aire River, SE of Fischers Point, Horden Vale, Victoria; P 74085, same as type locality. All specimens collected by T.A. Darragh and H.E. Wilkinson.

Type locality: Gellibrand Clay (Batesfordian), Cobden-Lavers Hill Road, cut 1 km south of turnout to Kennedy's Creek, north of Princetown, Victoria.

Discussion: In the collections of the National Museum of Victoria there are five specimens of a species that is closely related to the slightly younger (Balcombian) *D. asteriscus*. From the latter this new species differs in having a more elongated siphonal canal and less inflated body whorl. The inner side of the outer lip, so far as the available material shows, lacks the denticulations of *D. asteriscus*. In many ways the shell more nearly resembles the Recent *D. antonius*, but differs from that species also in the lack of labral denticles.

The writer takes pleasure in naming this species in honour of Dr Thomas A. Darragh, of the National Museum of Victoria, for his extensive work on the Tertiary of Australia. He collected not only the material upon which this species is based but most of the other fossil material utilized in this entire paper.

DERMOMUREX (VIATOR) ASTERISCUS (Tate)

Plate 3, figs. 1, 2

Murex (Rhinocantha) asteriscus TATE, 1888, Trans. Roy. Soc. So. Aust., v. 10, p. 102, pl. 2, fig. 10.

Bolinus asteriscus (Tate). COTTON, 1956, Publ. Roy. Soc. So. Aust., Malac. Section, no. 8, Muricidae [p. 1].

[*Aspella*] (*Takia*) *asteriscus* (Tate). VOKES, 1971, Bulls. Amer. Paleont., v. 61, no. 268, p. 20.

Dermomurex (Viator) asteriscus (Tate). VOKES, 1974, J. Malac. Soc. Aust., v. 3, no. 1, p. 5, pl. 1, fig. 3; 1975, Tulane Stud. Geol. Paleont., v. 11, no. 3, pp. 127, 153, pl. 6, fig. 3.

Description: Shell very inflated with six teleoconch whorls and a protoconch of one and one-half large, bulbous whorls, terminating at a small sharp varix. Spiral ornamentation on early post-nuclear whorls of a single strong cord at the periphery, by third post-nuclear whorl a second cord added at shoulder; on body whorl six strong cords and an additional three or four on the extended siphonal canal; entire surface covered by very faint spiral striae. Axial ornamentation beginning on earliest post-nuclear whorls with six or seven rounded varices, these persisting in the same number on each successive whorl; varices increasing in strength on each whorl and undulated by the crossing of the spiral cords, especially at the shoulder where a small abapertural flange may be developed. Suture greatly impressed, crossed by varices abutting against the corresponding varix on preceeding whorl, but placed abaperturally, giving a backward spiral to the varical line from spire to canal. Aperture large, oval; inner lip smooth, slightly flaring at anterior end, appressed at posterior end and curving gently into outer lip; latter crenulated on outer margin, reflecting major spiral cords, about 12 small denticles within. Siphonal canal long, straight, successive canals sealed into a tube-like structure, almost closed but open by a narrow slit. In life entire surface covered by a thick intritacalx but usually lost in fossil state, with only remnant patches remaining.

Holotype: South Australian Museum (AUGD) T440B.

Type locality: Muddy Creek, west of Hamilton, Victoria.

Figured specimens: National Museum of Victoria P 74087; height 27.0 mm, diameter 18.8 mm (J. Dennant Coll.) (Plate 3, fig. 1). South Australian Museum (AUGD) T 440B (holotype); height 27 mm, diameter 19 mm (*vide* Tate, 1888) (Plate 3, fig. 2). Locality of both, Muddy Creek Marl (Balcombian), Muddy Creek, 8 km west of Hamilton, Victoria.

Discussion: As with *D. pachystirus*, this species was also placed in *Rhinocantha* (= *Bolinus*) by Tate. The writer (Vokes, 1971) originally considered it a member of the subgenus *Takia* (which she assigned to the genus *Aspella*, at the time), but the discovery of *D. antonius*, which is so clearly the living descendant of *D. asteriscus* caused a re-evaluation of the form, with subsequent placement in the newly erected subgenus *Viator* (Vokes, 1974a).

This species does not seem to be as rare as *D. pachystirus* with which it is said to occur, there are three examples in the collections of the National Museum of Victoria and another in the U.S. National Museum (that figured by Vokes previously in 1974a, 1975). But so far as known it occurs only at Muddy Creek.

DERMOMUREX (VIATOR) ANTONIUS Vokes

Dermomurex (Viator) antonius VOKES, 1974, J. Malac. Soc. Aust., v. 3, no. 1, p. 4, pl. 1, figs. 1, 2; 1975, Tulane Stud. Geol. Paleont., v.11, no.3, pp. 127, 153, pl. 6, figs. 4, 5.

Viator antonius (Vokes). FAIR, 1976, The Murex Book, p. 21, pl. 16, fig. 21.

Description: "Protoconch relatively large, 1½ bulbous whorls, slightly papillate; terminating at a pronounced crescentic varix. Six teloconch whorls in adult. Spiral ornamentation normally masked by intritacalx but when latter is removed the shell can be seen to be covered by numerous spiral cords of three orders of magnitude: moderately heavy cords, about six in number on the body whorl plus an additional three or four on the siphonal canal; between each pair of major cords, a slightly smaller spiral ridge and alternating with these a tertiary thread, so that the pattern formed is a typical muricine one of first order spiral, third order, second, third, first, repeated over the entire surface. On the spire three major spiral cords beneath the intritacalx. Axial ornamentation of six rounded varices per whorl, which extend the entire length of the anterior canal. Suture greatly impressed, crossed by the varices, which abut each previous whorl slightly abaxially to the corresponding varix. Aperture oval, with small, raised peristome, about seven indistinct denticles within the outer lip; inner lip smooth. Siphonal canal long, straight, with previous terminations fused into an almost smooth tube, nearly covered over by a thin plate extending from the columellar wall, but open by a narrow slit. Colour of shell a light brown but normally covered by the ivory-coloured intritacalx, which is a thick, spongy, deciduous, calcareous material that when unworn has the appearance of having a series of small perforations arranged in spiral rows over the entire external shell surface. When broken away, as it frequently is, the interior of this intritacalx can be seen honeycombed with fine tubes, in spiral lines circling the shell. Animal unknown; operculum muricoid with apical nucleus." (Vokes, 1974)

Holotype: Western Australian Museum 3646-67; height 25.7 mm, diameter 13.5 mm.

Type locality: Scholl Island, Dampier Archipelago, Western Australia.

Discussion: This unusual species, which was named as the type of a new subgenus when originally described, was based upon two specimens taken in 1960 by the King-Western Australian Expedition in the Dampier Archipelago. Although the paratype came from only 42 metres depth (no data on the holotype), to the writer's knowledge no additional specimens have been found since the initial collection. Thus, there is nothing to be added to the original discussion, wherein it was noted that this species was obviously the living descendant of the Miocene *D. asteriscus*, differing from that form only in having a more diverse spiral ornamentation, a smaller aperture, and a longer siphonal canal. In the two latter aspects it more nearly resembles the new species described above as *D. darraghi*, which is however somewhat older (Longfordian — early Miocene) than *D. asteriscus* (Balcambian — middle Miocene).

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Gackle, of the South Australian Museum, provided the photographs of Tate's and Verco's types (both those published herein and others that were not used). Joseph Rosewater, U.S. National Museum, loaned a Recent specimen for figuring; George W. Kendrick, Western Australian Museum, provided material from the Roe Calcarenite; and W.H. Akers, Chevron Oil Field Research Company, determined a critical age date; to all of these persons she is extremely grateful. The manuscript was greatly improved by the suggestions of both Dr Darragh and Dr Myra Keen, Stanford University (Emeritus).

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PLATE 1

Figures

- 1-4. *Dermomurex (Dermomurex) garrardi* E.H. Vokes, sp. nov.
 1. (X 4) National Museum of Victoria P 74477 (holotype); height 16.0 mm, diameter 6.5 mm
 2. (X 4) Australian Museum C.131237 (paratype A); height 13.4 mm, diameter 5.2 mm
 3. (X 4) South Australian Museum P 23845 (paratype B); height 11.6 mm, diameter 5.0 mm
 4. (X 4) Australian Museum C.131237a (paratype C); height 11.0 mm, diameter 5.5 mmLocality of all: Fossil Beach, Balcombe Bay, Victoria
- 5, 6. *Dermomurex (Dermomurex) goldsteini* (Tenison-Woods)
 5. (X 3) Australian Museum C.125234; height 18.5 mm, diameter 9.4 mmLocality: d'Entrecasteaux Channel, Tasmania
 6. (X 2¼) Australian Museum C.125232; height 21.0 mm, diameter 10.0 mmLocality: Eden, New South Wales
7. *Dermomurex (Triatella) neglecta* (Habe and Kosuge)
 - (X 2) Vokes Coll.; height 22.4 mm, diameter 11.9 mmLocality: Bonin Islands, 200 metres
- 8, 9. *Dermomurex (Dermomurex) angustus* (Verco)
 8. (X 3) South Australian Museum D13482(A) (paratype A); height 10.3 mm, diameter 4.5 mm.
 9. (X 3) South Australian Museum D13482(B) (paratype B); height 10.6 mm, diameter 4.5 mmLocality of both: St Vincent Gulf, deep-water.
NOTE: These photographs are reproduced by the courtesy of the South Australian Museum
10. *Dermomurex (Dermomurex) scalaroides* (Blainville)
 - (X 3) U.S. National Museum 89092; height 18.0 mm, diameter 8.8 mmLocality: Sicily

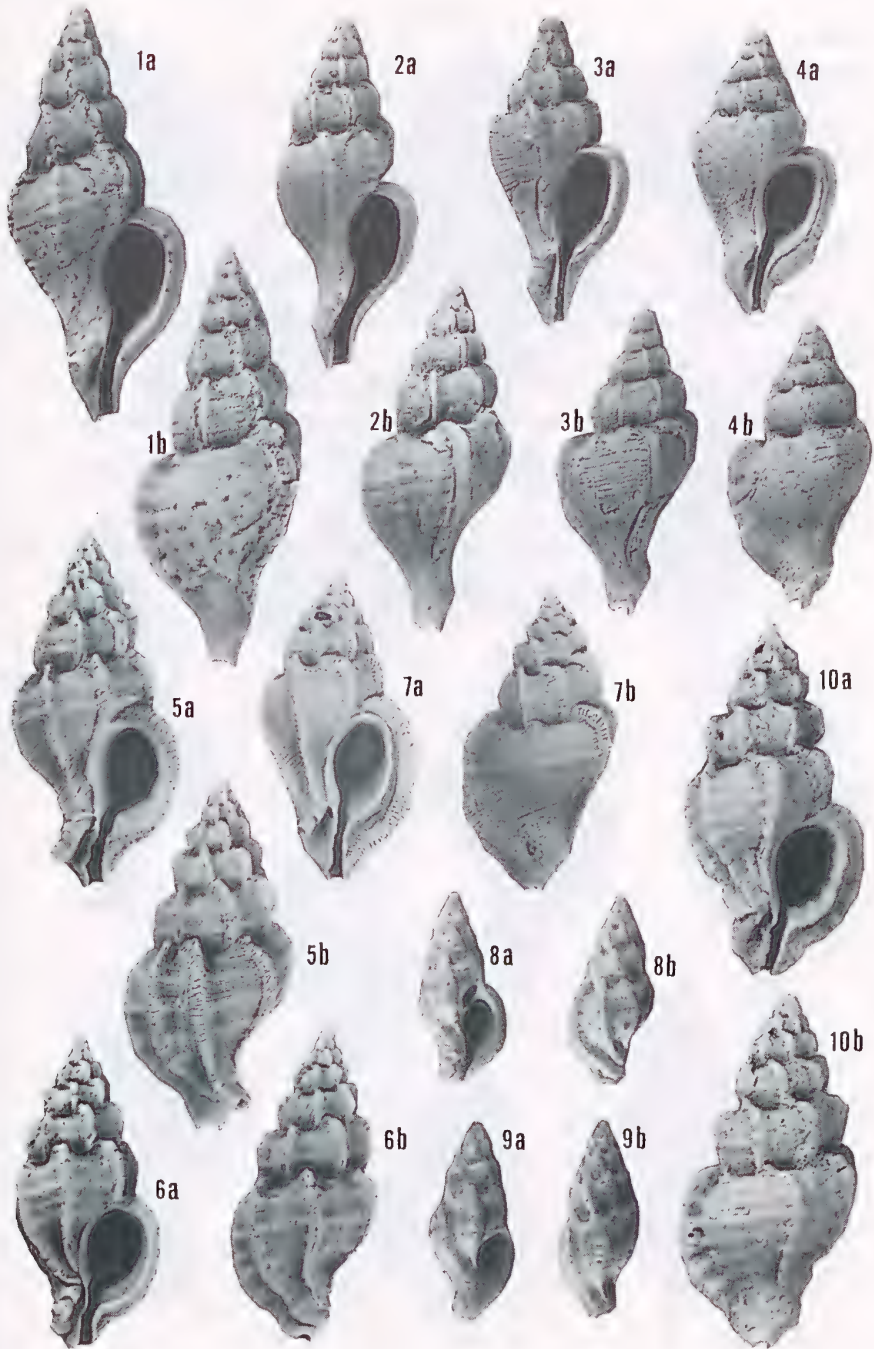


PLATE 2

Figures

1. *Dermomurex (Takia) imitator* E.H. Vokes, sp. nov.
(X 1½) National Museum of Victoria P 74074 (holotype); height 28.4 mm, diameter 19.6 mm
Locality: Bird Rock Cliff, Torquay, Victoria
2. *Dermomurex (Takia) sexangulus* (Dall)
(X 1½) U.S. National Museum 644377; height 43.5 mm, diameter 26.0 mm
Locality: Silverdale, North Carolina, USA
3. *Dermomurex (Takia) pachystirus* (Tate)
(X 2) South Australian Museum (AUGD) T410 (holotype); height 24 mm, diameter 15.5 mm
Locality: Murray River Cliffs, near Morgan, South Australia
NOTE: These photographs are reproduced by the courtesy of the South Australian Museum
- 4-6. *Dermomurex (Takia) cretaceus* Vokes, sp. nov.
 4. (X 3) National Museum of Victoria P 74140 (holotype); height 24.6 mm, diameter 11.7 mm
 5. (X 3) South Australian Museum P 23844 (paratype A); height 18.3 mm, diameter 9.5 mm
 6. (X 4) Australian Museum C.139791 (paratype B); height 11.5 mm, diameter 6.4 mm
Locality of all: Pt Flinders, Cape Otway, Victoria
7. *Dermomurex (Takia) bobyini* (Kosuge)
(X 2) Paratype, collection of Victor Dan; height 27.7 mm, diameter 12.2 mm (reproduced from Kosuge, 1984, pl. 50, fig. 1).
Locality: Panglao, Bohol, Philippines, 120 fms. (=220 m).



PLATE 3

Figures

1, 2. *Dermomurex (Viator) asteriscus* (Tate)

1. (X 2) National Museum of Victoria P 74087; height 27.0 mm, diameter 18.8 mm

2. (X 2) South Australian Museum (AUGD) T 440B (holotype); height 27 mm, diameter 19 mm (*vide* Tate, 1888)

NOTE: These photographs are reproduced by the courtesy of the South Australian Museum
Locality of both: Muddy Creek, Hamilton, Victoria.

3, 4. *Dermomurex (Takia) darraghi* Vokes, sp. nov.

3. (X 3) National Museum of Victoria P 74086 (holotype); height 18.5 mm, diameter 10.7 mm
Locality: Cobden-Lavers Hill Rd., Victoria

4. (X 3) National Museum of Victoria P 74083 (paratype); height 19.0 mm, diameter 10.4 mm
Locality: Lake Craven, Horden Vale, Victoria

5-7. *Dermomurex (Takia) glebosus* Vokes, sp. nov.

5. (X 2) Western Australian Museum 83.601 (holotype); height 28.8 mm; diameter 15.2 mm

6. (X 10) Western Australian Museum 84.602 (paratype A); height 6.3 mm, diameter 2.8 mm

7. (X 2) Australian Museum C.90093 (paratype B); height 28.8 mm, diameter 14.8 mm
Locality of all: Roe Plains, Madura District, Western Australia.

